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Book Review

Beyond PCR: Biotechnology as an Emerging Culture

Making PCR. A Story of Biotechnology.
By Paul Rabinow.
Chicago: The University of Chicago Press. (1996). 190 pp. $22.50

Far from limiting his work to a description of a fundamental discovery that ultimately transformed the practices and potential of molecular biology, Paul Rabinow's *Making PCR* is a true voyage into the emerging environment of biotechnology during the eighties.

The author, professor of anthropology at the University of California, Berkeley, defines himself as "curious about the form of life in the making both within the labs and beyond (as tentative, divergent, and emergent as it is)." As such, Rabinow chose to explore the steps and circumstances of how (and by whom) the polymerase chain reaction (PCR) was conceived at Cetus Corporation, the first recombinant DNA start-up company, founded in 1971. In the perspective of this ethnographic approach, Cetus should be considered, as defined by the author, to be a "fortuitous space of experimentation," in which one may see "a certain kind of instrumentalization of sites, subjects, and objects coming together, for a time, into a contingent ensemble." For his part, Rabinow was concerned about learning enough molecular biology to form his own understanding of the new challenges raised by the advancements in science.

What make Rabinow's work positively fascinating, and accessible to both scientists and neophytes, are the insights it provides into what could be characterized as the new "culture" of biotechnology, a culture shaped by the encounter of two distinct worlds: university scientists and industry. An encounter of people having left their respective and until then supposedly opposed backgrounds, to join the high-risk industry, a milieu itself in constant evolution. Its actors were concerned with combining academic standards of research and profitability. As a matter of fact, witnessing the emergence of the promising era of new techniques such as cloning, genetic engineering, and DNA recombination, scientists were even more encouraged to apply research progress to potential therapeutic utility rapidly, instead of losing precious time in writing grants and assuming heavy teaching loads.

As such, PCR, by extending the ability to identify and manipulate genetic material, undoubtedly deserves to be described to any reader. Nevertheless, *Making PCR* sheds new light on questions that are of concern to every scientist. The author raises a fundamental issue: what are the criteria underlying the definition of an invention? Is it merely a technique? Should one focus on its conceptualization, despite other scientists' contributions in making this concept work? Or would it be more appropriate to use such a term only when the concept has been proven to work in an experimental system providing reproducible results? Although, in this case, the laurels went exclusively to Kary B. Mullis, who shared the 1993 Nobel Prize for chemistry, Cetus' scientists contribution, which ultimately ended up in a drawer of history, proved significant enough to justify an expolarion of this issue.

Hence, more than an account of the invention of PCR, Rabinow's working approach should be viewed as "an experiment in posing the problem of who has the authority—and responsibility—to represent experience and knowledge." Cetus Corporation offered a privileged research environment where team spirit boosted motivation. The breakthrough of PCR and its consequent first Nobel Prize based on research performed in a start-up biotechnology company, is significant: it should be understood as the recognition that start-up biotechnology companies are able to produce creative research projects. Cetus' working ambiance and management style made it possible for scientists to pursue experiments aimed at proving that the concept of PCR works, despite initial doubts about the outcome of such experiments. Concluding his work, with what should be seen as an overall optimistic vision towards future research, Paul Rabinow qualifies Cetus scientists "as earnest, intelligent, hardworking, and reasonably optimistic. These Americans are real professionals (...). Their scientific practice, they firmly believe, contributes to a general broadening of scientific understanding and technical mastery, to an eventual improvement of public health, and even to the betterment of society."

As much as PCR became a milestone in research, *Making PCR* provides a fundamental contribution to the understanding of how such discoveries may happen and how an idea ends up reshaping research perspectives. Far from simply describing the fierce competition between laboratories, by referring to major philosophers of sciences, Rabinow explores the meaning of being a scientist today.

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